U.S. Department of Energy

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Design Information Available at License Application

Presented to:

NRC/DOE Technical Exchange and Management Meeting on Preclosure Safety Analysis and Supporting Information

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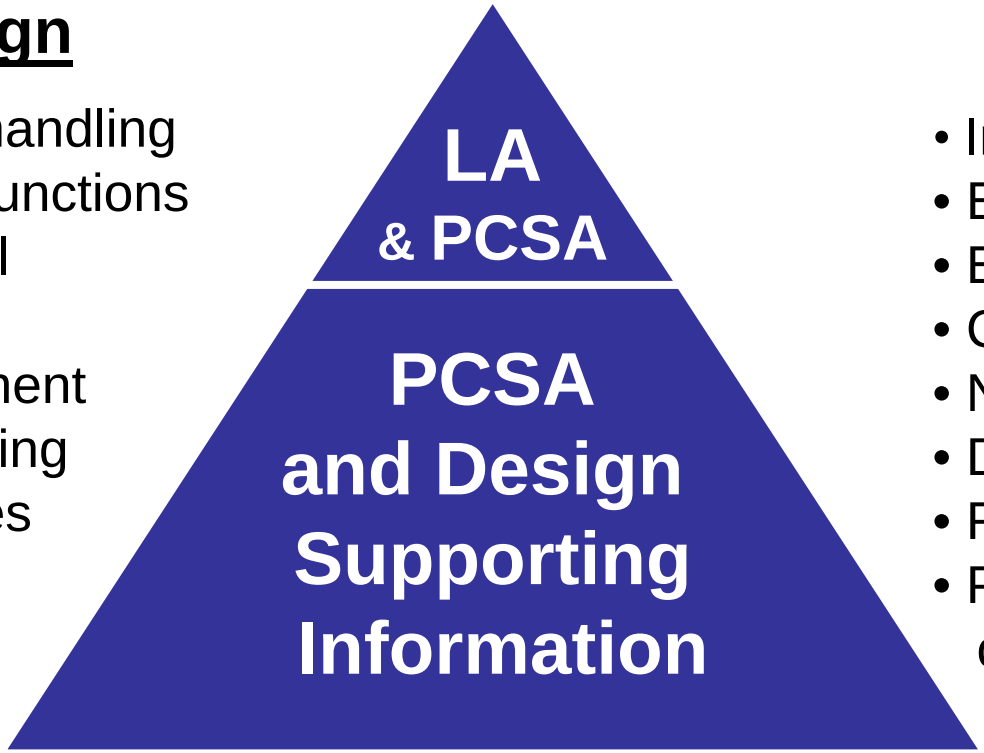
LA and PCSA Supported by Detailed Design and Analyses

Design

- Waste handling
- Safety functions
- Physical
- System
- Component
- Supporting analyses



PCSA

- Internal hazards
- External hazards
- Event sequences
- Consequences
- NSDBs
- Design requirements
- Reliability assessments
- Procedural safety controls

LA = License Application
NSDB = Nuclear Safety Design Bases
PCSA = Preclosure Safety Analysis

Intended Changes to LA Content and Supporting Information

- Greater development of design
- More detailed evaluation of design feasibility
- Greater design information available for PCSA
- More detailed safety evaluation
- Explicit handling of uncertainty and human error
- More detailed presentation of design and PCSA in Safety Analysis Report (SAR) / License Application
- More complete justification of safety case

LA will Present Design Information Used in the PCSA

- **Physical Design – Source Documents**
  - **Project design criteria**
  - **Basis of design**
  - **Site plan and general arrangement drawings**
  - **Facility descriptions**
  - **Zone drawings (radiation, confinement, etc.)**
  - **Wall, slab, and structural steel drawings**

LA will Present Design Information Used in the PCSA

- **Physical Design – Source Documents (cont.)**
  - **Typical embed, anchorage, and penetration details**
  - **Typical concrete and rebar details**
  - **Geo-technical data**
  - **Sliding and overturning assessment**
  - **Analytical models for structures**
  - **Soil-structure interaction analyses**
  - **In-structure response spectra**

LA will Present Design Information Used in the PCSA

- **System Design - Source Documents**
  - **Project design criteria**
  - **Basis of design**
  - **System descriptions**
  - **Piping and instrumentation diagrams**
  - **Ventilation and instrumentation diagrams**

LA will Present Design Information Used in the PCSA

- **System Design - Source Documents (cont.)**
  - **Mechanical handling flow diagrams**
  - **Functional logic diagrams (automatic important to safety [ITS] functions)**
  - **Electrical single line diagrams (site and facility)**
  - **Waste package drawings**

LA will Present Design Information Used in the PCSA

- **Component Design – Source Documents**
  - **Project design criteria**
  - **Basis of design**
  - **System descriptions**
  - **Mechanical equipment envelopes**
  - **Mechanical handling schematics (ITS functions)**
  - **Sizing analyses**

LA will Present the PCSA

- External hazards analysis
- Site-specific suitability assessments
- Military-industrial hazards analysis
- Aircraft crash frequency analysis
- Internal hazards analysis
- Fire hazards analysis
- Mechanical system fault trees
- Electrical system fault trees

LA will Present the PCSA (cont.)

- Overhead load handling assessments
- Seismic fragility assessment of structures
- Categorization of event sequences
- Consequence analyses
- Worker dose assessments
- Nuclear safety design bases
- ITS structures, systems, or components (SSCs) and Q-List
- Procedural safety controls

Safety Information is Contained in Physical, System and Component Design and PCSA Documents

- Location and arrangement of SSCs
- Materials
- Dimensions
- Waste package and transport, aging and disposal (TAD) canister characteristics
- ITS boundaries
- Seismic design boundaries
- Automatic versus manual actuation
- Fail position of components
- Local or remote control
- Interlocks
- Power sources
- Hazards assessment
- Event sequences
- Nuclear safety design bases
- ITS SSCs and Q-List
- Procedural safety controls
- Design assessment and validation

LA will Demonstrate ITS SSCs Can Perform Their Safety Functions

- **Nuclear safety design bases and implementation**
- **Safety functions**
- **Description of required operation**
- **Design feasibility assessment**
- **Tables and figures**
  - **Functional requirements**
  - **Pertinent design information**
  - **Features demonstrating safety functions**

ITS vs. non-ITS SSC Content in the License Application

Item	Non-ITS	ITS
Description	X	X
Design codes and standards	X	X
Operational processes and procedural needs	X	X
Safety functions	-	X
Procedural safety controls	-	X
Design criteria and design bases	-	X
Design methodologies	-	X
Consistency of materials with design methodologies	-	X
Design load combinations	-	X

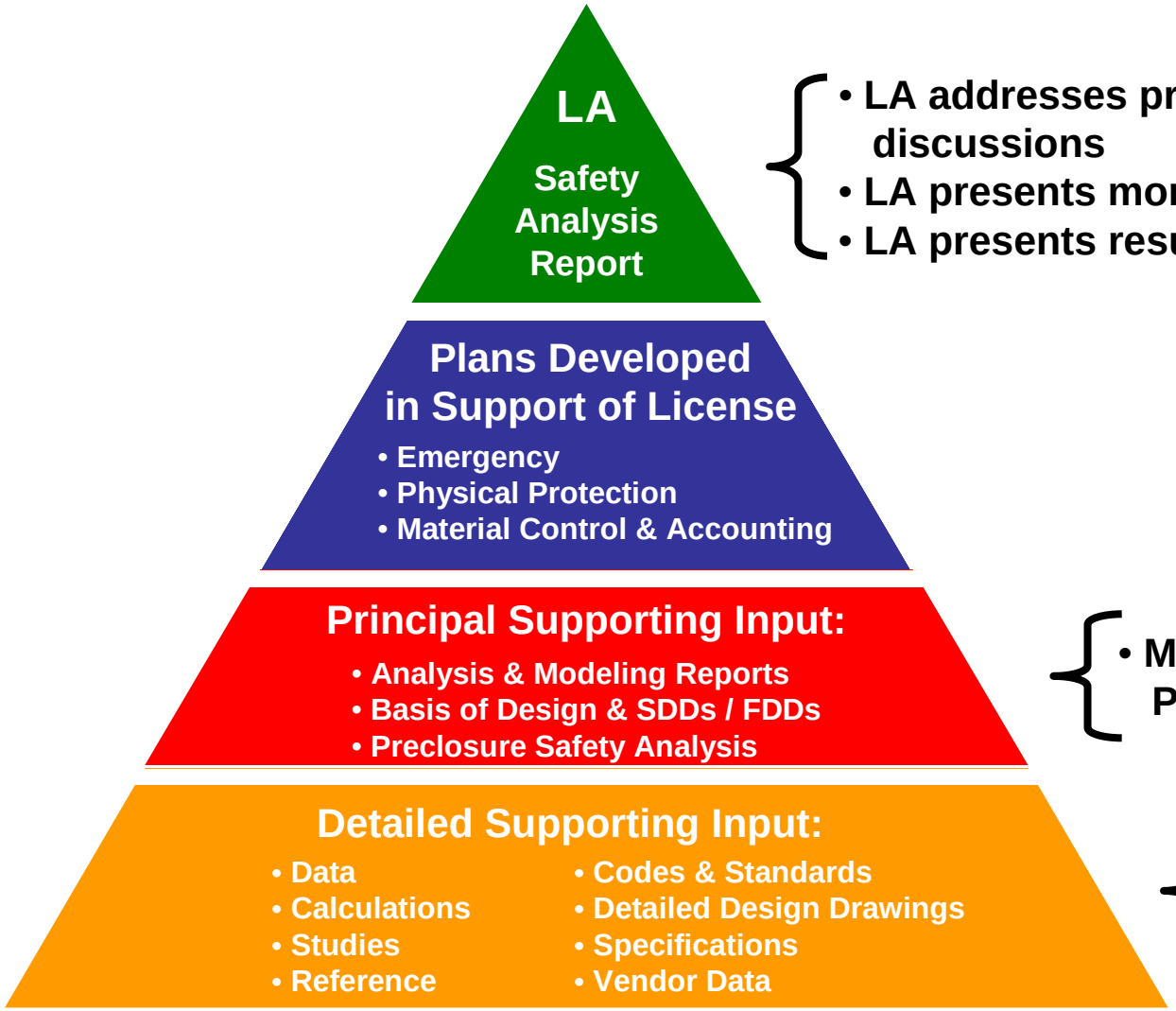
Opportunities for Improvement from Previous Interactions

- **Use of Codes and standards**
- **Thermal management**
- **Content of proposed technical specifications**
- **Structural analysis detail and presentation of results**

Opportunities for Improvement from Previous Interactions (cont.)

- **Implementation of nuclear safety design bases**
- **Reliability analysis of active safety functions**
- **Capability of load hold-down devices**
- **Justification for selected non-ITS systems**

License Application and Supporting Bases



- LA addresses previous NRC/DOE discussions
- LA presents more detail to support PCSA
- LA presents results of structural analysis

- More extensive and detailed PCSA analysis

- More detailed design development
- Resolution of specific topics addressed in design and PCSA